

**SAF-B03-018**  
**ERDF Groundwater Well Samples**  
**FINAL DATA PACKAGE**

**MAIL COMPLETE COPY OF DATA PACKAGE TO:**

Jim Rugg	H9-03	____ NB 12-6/05 ____ INITIAL/DATE
Rich Weiss	H9-01	____ NB 12-6/05 ____ INITIAL/DATE
Jeanette Duncan	H9-02	____ NB 12-6/05 ____ INITIAL/DATE

**COMMENTS:**

SDG \_\_\_\_\_ K0047 \_\_\_\_\_ SAF-B03-018

X Rad only      Chem only      Rad & Chem

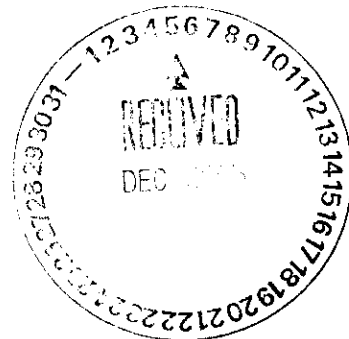
X Complete      Partial

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# EBERLINE

SERVICES



December 2, 2005

Ms. Joan Kessner  
Washington Closure Hanford  
3190 George Washington Way  
MSIN H9-02  
Richland, WA 99352

Reference: **P.O. #630**  
**Eberline Services R5-10-085-7319, SDG K0047**

Dear Ms. Kessner:

Enclosed is the data report for one water sample designated under SAF No. B03-018 received at Eberline Services on October 14, 2005. The sample was analyzed according to the accompanying chain-of-custody document.

Please call if you have any questions concerning this report.

Sincerely,

Melissa C. Mannion  
Senior Program Manager

MCM/

Enclosure: Data Package

Analytical Services  
2030 Wright Avenue  
P.O. Box 4040  
Richmond, California 94804-0040  
(510) 235-2633 Fax (510) 235-0438  
Toll Free (800) 841-5487  
[www.eberlineservices.com](http://www.eberlineservices.com)

## 1.0 GENERAL

Washington Closure Hanford (WCH) Sample Delivery Group K0047 was composed of one water sample designated under SAF No. B03-018 with a Project Designation of: ERDF Groundwater Well Samples.

The sample was received as stated on the Chain-of-Custody document. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist. The results were transmitted to WCH via e-mail on November 23, 2005.

## 2.0 ANALYSIS NOTES

### 2.1 Gross Alpha and Gross Beta Analysis

No problems were encountered during the course of the analyses.

### 2.2 Carbon-14 Analysis

No problems were encountered during the course of the analyses.

### 2.3 Iodine-129 Analysis

No problems were encountered during the course of the analyses.

### 2.4 Total Radium Analysis

No problems were encountered during the course of the analyses.

### 2.5 Technetium-99 Analysis

No problems were encountered during the course of the analyses.


### 2.6 Total Uranium Analysis

No problems were encountered during the course of the analyses.

## Case Narrative Certification Statement

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

  
\_\_\_\_\_  
Melissa C. Mannion  
Senior Program Manager

  
\_\_\_\_\_  
Date

EBERLINE SERVICES / RICHMOND  
SAMPLE DELIVERY GROUP K0047

SDG 7319  
Contact Melissa C. Mannion

Client Hanford  
Contract No. 630  
Case no SDG\_K0047

S U M M A R Y   D A T A   S E C T I O N

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*K. Gemill*  
Prepared by

*Melissa Mannion*  
Reviewed by

Lab id EBRLNE  
Protocol Hanford  
Version Ver 1.0  
Form DVD-TOC  
Version 3.06  
Report date 11/23/05

# EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP K0047

SDG 7319  
Contact Melissa C. Mannion

## REPORT GUIDE

Client Hanford  
Contract No. 630  
Case no SDG K0047

### ABOUT THE DATA SUMMARY SECTION

The Data Summary Section of a Data Package has all data, in several useful orders, necessary for first level, routine review of the data package for a Sample Delivery Group (SDG). This section follows the Data Package Narrative, which has an overview of the data package and a discussion of special problems. It is followed by the Raw Data Section, which has full details.

The Data Summary Section has several groups of reports:

#### SAMPLE SUMMARIES

The Sample and QC Summary Reports show all samples, including QC samples, reported in one SDG. These reports cross-reference client and lab sample identifiers.

#### PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches (lab groupings reflecting how work was organized) relevant to the reported SDG with information necessary to check the completeness and consistency of the SDG.

#### WORK SUMMARY

The Work Summary Report shows all samples and work done on them relevant to the reported SDG.

#### METHOD BLANKS

The Method Blank Reports, one for each Method Blank relevant to the SDG, show all results and primary supporting information for the blanks.

#### LAB CONTROL SAMPLES

The Lab Control Sample Reports, one for each Lab Control Sample relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

#### REPORT GUIDES

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#### SUMMARY DATA SECTION

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# EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP K0047

SDG 7319  
Contact Melissa C. Mannion

GUIDE, cont.

Client Hanford  
Contract No. 630  
Case no SDG K0047

## ABOUT THE DATA SUMMARY SECTION

### DUPLICATES

The Duplicate Reports, one for each Duplicate and Original sample pair relevant to the SDG, show all results, differences and primary supporting information for these QC samples.

### MATRIX SPIKES

The Matrix Spike Reports, one for each Spiked and Original sample pair relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

### DATA SHEETS

The Data Sheet Reports, one for each client sample in the SDG, show all results and primary supporting information for these samples.

### METHOD SUMMARIES

The Method Summary Reports, one for each test used in the SDG, show all results, QC and method performance data for one analyte on one or two pages. (A test is a short code for the method used to do certain work to the client's specification.)

### REPORT GUIDES

The Report Guides, one for each of the above groups of reports, have documentation on how to read the associated reports.

### REPORT GUIDES

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### SUMMARY DATA SECTION

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# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0047

## SAMPLE SUMMARY

SDG 7319

Contact Melissa C. Mannion

Client Hanford

Contract No. 630

Case no SDG K0047

CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	LAB SAMPLE ID	SAF NO	CHAIN OF CUSTODY	COLLECTED
B1DMV8	DTS SAWS H93	WATER		R510085-01	B03-018	B03-018-124	10/13/05 09:54
Method Blank		WATER		R510085-03	B03-018		
Lab Control Sample		WATER		R510085-02	B03-018		
Duplicate (R510085-01)	DTS SAWS H93	WATER		R510085-04	B03-018		10/13/05 09:54
Spike (R510085-01)	DTS SAWS H93	WATER		R510085-05	B03-018		10/13/05 09:54

SAMPLE SUMMARY

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SUMMARY DATA SECTION

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Lab id EBRLNE

Protocol Hanford

Version Ver 1.0

Form DVD-CS

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Report date 11/23/05

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0047

SDG 7319  
Contact Melissa C. Mannion

## QC SUMMARY

Client Hanford  
Contract No. 630  
Case no SDG K0047

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	SOLIDS	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	LAB COLL SAMPLE ID	DEPARTMENT SAMPLE ID
7319	B03-018-124	B1DMV8	WATER		7.0 L		10/14/05 1	R510085-01	7319-001
		Method Blank	WATER					R510085-03	7319-003
		Lab Control Sample	WATER					R510085-02	7319-002
		Duplicate (R510085-01)	WATER		7.0 L		10/14/05 1	R510085-04	7319-004
		Spike (R510085-01)	WATER		7.0 L		10/14/05 1	R510085-05	7319-005

QC SUMMARY

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Lab id EBRLNE  
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Form DVD-QS  
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# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0047

SDG 7319

Contact Melissa C. Mannion

## PREP BATCH SUMMARY

Client Hanford

Contract No. 630

Case no SDG K0047

			PREPARATION	ERROR			PLANCHETS ANALYZED			QUALI-		
TEST	MATRIX	METHOD	BATCH	2σ %	CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG	MS/ORIG	FIERS
Beta Counting												
TC	WATER	Technetium 99 in Water	7148-075	10.0	1			1	1	1/1		
Gas Proportional Counting												
RAT	WATER	Total Alpha Radium in Water	7148-075	5.0	1			1	1	1/1		
Gas Proportional Counting												
82B	WATER	Gross Beta in Water	7148-075	15.0	1			1	1	1/1		
88A	WATER	Gross Alpha in Water	7148-075	20.0	1			1	1	1/1		
Gamma Spectroscopy												
I	WATER	Iodine 129 in Water	7148-075	5.0	1			1	1	1/1		
Kinetic Phosphorimetry (KPA)												
U_T	WATER	Uranium, Total in Water	7148-075	9.0	1			1	1	1/1		
Liquid Scintillation Counting												
C	WATER	Carbon 14 in Water	7148-075	10.0	1			1	1	1/1	1/1	X

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.

Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

PREP BATCH SUMMARY

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# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0047

SDG 7319  
Contact Melissa C. Mannion

## WORK SUMMARY

Client Hanford  
Contract No. 630  
Case no SDG K0047

CLIENT SAMPLE ID		LAB SAMPLE ID													
LOCATION	MATRIX	COLLECTED	PLANCHET	TEST	SUF-	ANALYZED	REVIEWED	BY	METHOD						
CUSTODY	SAF No	RECEIVED			FIX										
B1DMV8		R510085-01	7319-001	82B/82		11/16/05	11/16/05	MWT	Gross Beta in Water						
DTS SAWS H93	WATER	10/13/05	7319-001	88A/88		11/18/05	11/23/05	MWT	Gross Alpha in Water						
B03-018-124	B03-018	10/14/05	7319-001	C		11/14/05	11/23/05	MWT	Carbon 14 in Water						
			7319-001	I		11/18/05	11/22/05	MWT	Iodine 129 in Water						
			7319-001	RAT		11/18/05	11/21/05	MWT	Total Alpha Radium in Water						
			7319-001	TC		11/22/05	11/23/05	MWT	Technetium 99 in Water						
			7319-001	U_T		11/07/05	11/09/05	MWT	Uranium, Total in Water						
Method Blank		R510085-03	7319-003	82B/82		11/12/05	11/16/05	MWT	Gross Beta in Water						
	WATER		7319-003	88A/88		11/18/05	11/23/05	MWT	Gross Alpha in Water						
	B03-018		7319-003	C		11/14/05	11/23/05	MWT	Carbon 14 in Water						
			7319-003	I		11/21/05	11/22/05	MWT	Iodine 129 in Water						
			7319-003	RAT		11/18/05	11/21/05	MWT	Total Alpha Radium in Water						
			7319-003	TC		11/21/05	11/23/05	MWT	Technetium 99 in Water						
			7319-003	U_T		11/07/05	11/09/05	MWT	Uranium, Total in Water						
Lab Control Sample		R510085-02	7319-002	82B/82		11/12/05	11/16/05	MWT	Gross Beta in Water						
	WATER		7319-002	88A/88		11/22/05	11/23/05	MWT	Gross Alpha in Water						
	B03-018		7319-002	C		11/14/05	11/23/05	MWT	Carbon 14 in Water						
			7319-002	I		11/19/05	11/22/05	MWT	Iodine 129 in Water						
			7319-002	RAT		11/18/05	11/21/05	MWT	Total Alpha Radium in Water						
			7319-002	TC		11/21/05	11/23/05	MWT	Technetium 99 in Water						
			7319-002	U_T		11/07/05	11/09/05	MWT	Uranium, Total in Water						
Duplicate (R510085-01)		R510085-04	7319-004	82B/82		11/16/05	11/16/05	MWT	Gross Beta in Water						
DTS SAWS H93	WATER	10/13/05	7319-004	88A/88		11/18/05	11/23/05	MWT	Gross Alpha in Water						
	B03-018	10/14/05	7319-004	C		11/14/05	11/23/05	MWT	Carbon 14 in Water						
			7319-004	I		11/21/05	11/22/05	MWT	Iodine 129 in Water						
			7319-004	RAT		11/18/05	11/21/05	MWT	Total Alpha Radium in Water						
			7319-004	TC		11/22/05	11/23/05	MWT	Technetium 99 in Water						
			7319-004	U_T		11/07/05	11/09/05	MWT	Uranium, Total in Water						
3spike (R510085-01)		R510085-05	7319-005	C		11/14/05	11/23/05	MWT	Carbon 14 in Water						
DTS SAWS H93	WATER	10/13/05													
	B03-018	10/14/05													

### WORK SUMMARY

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# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0047

SDG 7319

Contact Melissa C. Mannion

## WORK SUMMARY, cont.

Client Hanford

Contract No. 630

Case no SDG K0047

### COUNTS OF TESTS BY SAMPLE TYPE

TEST	SAF No	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
82B/82	B03-018	Gross Beta in Water	900.0_ALPHABETA_GPC	1			1	1	1		4
88A/88	B03-018	Gross Alpha in Water	900.0_ALPHABETA_GPC	1			1	1	1		4
C	B03-018	Carbon 14 in Water	C14_CHEM_LSC	1			1	1	1	1	5
I	B03-018	Iodine 129 in Water	I129_SEP_LEPS_GS	1			1	1	1		4
RAT	B03-018	Total Alpha Radium in Water	RATOT_GPC	1			1	1	1		4
TC	B03-018	Technetium 99 in Water	TC99_TR_SEP_LSC	1			1	1	1		4
U_T	B03-018	Uranium, Total in Water	UTOT_KPA	1			1	1	1		4
TOTALS				7			7	7	7	1	29

WORK SUMMARY

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**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP K0047**

R510085-03

Method Blank

**METHOD BLANK**

SDG <u>7319</u>	Client/Case no <u>Hanford</u>	SDG <u>K0047</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R510085-03</u>	Client sample id <u>Method Blank</u>	
Dept sample id <u>7319-003</u>	Material/Matrix <u>WATER</u>	
	SAF No <u>B03-018</u>	

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	0.079	0.41	0.92	3.0	U	88A
Gross Beta	12587-47-2	-0.033	1.0	1.8	4.0	U	82B
Carbon 14	14762-75-5	-22.0	36	62	200	U	C
Technetium 99	14133-76-7	-0.555	1.5	5.1	15	U	TC
Total Uranium (ug/L)	7440-61-1	0	0.023	0.054	0.10	U	U T
Total Radium	ALPHA-RA	-0.014	0.11	0.54	1.0	U	RAT
Iodine 129	15046-84-1	0.805	1.8	4.0	5.0	U	I

ERDF Groundwater Well Samples

QC-BLANK #54873
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**METHOD BLANKS**

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# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0047

R510085-02

Lab Control Sample

## LAB CONTROL SAMPLE

SDG <u>7319</u>	Client/Case no <u>Hanford</u>	SDG <u>K0047</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R510085-02</u>	Client sample id <u>Lab Control Sample</u>	
Dept sample id <u>7319-002</u>	Material/Matrix <u>WATER</u>	
	SAF No <u>B03-018</u>	

ANALYTE	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	65.4	5.6	1.5	3.0	88A	71.3	2.9	92	69-131	70-130
Gross Beta	65.0	3.3	1.9	4.0	82B	66.0	2.6	98	76-124	80-120
Carbon 14	7730	270	140	200	C	7970	320	97	83-117	80-120
Technetium 99	1150	30	5.3	15	TC	1090	44	106	83-117	80-120
Total Uranium (ug/L)	82.0	14	<u>0.54</u>	0.10	U_T	82.5	3.3	99	71-129	80-120
Total Radium	53.2	2.5	0.55	1.0	RAT	56.0	2.2	95	89-111	80-120
Iodine 129	457	11	<u>12</u>	5.0	I	464	19	98	90-110	80-120

ERDF Groundwater Well Samples

QC-LCS #54872

LAB CONTROL SAMPLES

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# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0047

R510085-04

B1DMV8

## DUPLICATE

SDG <u>7319</u>		Client/Case no <u>Hanford</u>		SDG <u>K0047</u>
Contact <u>Melissa C. Mannion</u>		Contract No. <u>630</u>		
DUPLICATE		ORIGINAL		
Lab sample id <u>R510085-04</u>	Lab sample id <u>R510085-01</u>	Client sample id <u>B1DMV8</u>		
Dept sample id <u>7319-004</u>	Dept sample id <u>7319-001</u>	Location/Matrix <u>DTG SAWS H93</u> <u>WATER</u>		
	Received <u>10/14/05</u>	Collected/Volume <u>10/13/05 09:54</u> <u>7.0 L</u>		
		Custody/SAF No <u>B03-018-124</u> <u>B03-018</u>		

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ORIGINAL pCi/L	2σ ERR (COUNT)	MDA pCi/L	QUALI- FIERS	RPD %	3σ TOT	DER σ
Gross Alpha	0.675	0.40	0.51	3.0		88A	0.862	0.97	1.5	U	24	209	0.3
Gross Beta	44.8	2.8	1.9	4.0		82B	44.6	2.9	2.0		0	35	0
Carbon 14	3.59	35	58	200	U	C	19.9	36	60	U	-		0.6
Technetium 99	70.8	6.0	5.6	15		TC	73.1	6.2	5.4		3	28	0.3
Total Uranium (ug/L)	1.97	0.32	0.055	0.10		U_T	2.00	0.33	0.055		2	40	0.1
Total Radium	-0.044	0.17	0.61	1.0	U	RAT	0.168	0.17	0.61	U	-		1.8
Iodine 129	2.89	1.9	4.3	5.0	U	I	5.30	1.5	3.4		59	89	2.0

ERDF Groundwater Well Samples

QC-DUP#1 54874

DUPLICATES

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# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0047

R510085-05

B1DMV8

## MATRIX SPIKE

SDG <u>7319</u>	Client/Case no <u>Hanford</u>	SDG <u>K0047</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
<b>MATRIX SPIKE</b>	<b>ORIGINAL</b>	
Lab sample id <u>R510085-05</u>	Lab sample id <u>R510085-01</u>	Client sample id <u>B1DMV8</u>
Dept sample id <u>7319-005</u>	Dept sample id <u>7319-001</u>	Location/Matrix <u>DTS SAWS H93</u> <u>WATER</u>
	Received <u>10/14/05</u>	Collected/Volume <u>10/13/05 09:54</u> <u>7.0 L</u>
		Custody/SAF No <u>B03-018-124</u> <u>B03-018</u>

ANALYTE	SPIKE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	ORIGINAL pCi/L	2σ ERR (COUNT)	REC 3σ % (TOTAL)	LMTS (TOTAL)	PROTOCOL LIMITS
Carbon 14	17000	580	<u>250</u>	200	X	C	23900	960	19.9	36	<u>71</u>	87-113	60-140

ERDF Groundwater Well Samples

QC-MS#1 54875

MATRIX SPIKES

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**EBERLINE SERVICES / RICHMOND**  
**SAMPLE DELIVERY GROUP K0047**

R510085-01

B1DMV8

**DATA SHEET**

SDG <u>7319</u>	Client/Case no <u>Hanford</u>	SDG <u>K0047</u>
Contact <u>Melissa C. Mannion</u>	Contract No. <u>630</u>	
Lab sample id <u>R510085-01</u>	Client sample id <u>B1DMV8</u>	
Dept sample id <u>7319-001</u>	Location/Matrix <u>DTS SAWS H93</u>	<u>WATER</u>
Received <u>10/14/05</u>	Collected/Volume <u>10/13/05 09:54</u>	<u>7.0 L</u>
	Custody/SAF No <u>B03-018-124</u>	<u>B03-018</u>

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	0.862	0.97	1.5	3.0	U	88A
Gross Beta	12587-47-2	44.6	2.9	2.0	4.0		82B
Carbon 14	14762-75-5	19.9	36	60	200	U	C
Technetium 99	14133-76-7	73.1	6.2	5.4	15		TC
Total Uranium (ug/L)	7440-61-1	2.00	0.33	0.055	0.10		U_T
Total Radium	ALPHA-RA	0.168	0.17	0.61	1.0	U	RAT
Iodine 129	15046-84-1	5.30	1.5	3.4	5.0		I

ERDF Groundwater Well Samples

**DATA SHEETS**

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**SUMMARY DATA SECTION**

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Lab id <u>EBRLNE</u>
Protocol <u>Hanford</u>
Version <u>Ver 1.0</u>
Form <u>DVD-DS</u>
Version <u>3.06</u>
Report date <u>11/23/05</u>



# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0047

Test TC Matrix WATER

SDG 7319

Contact Melissa C. Mannion

## METHOD SUMMARY

TECHNETIUM 99 IN WATER

BETA COUNTING

Client Hanford

Contract No. 630

Contract SDG K0047

## RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Technetium 99
------------------	------------------	-----------------	------------------	------------------

Preparation batch 7148-075

B1DMV8	R510085-01	7319-001	73.1
Method Blank	R510085-03	7319-003	U
Lab Control Sample	R510085-02	7319-002	ok
Duplicate (R510085-01)	R510085-04	7319-004	ok

Nominal values and limits from method RDLs (pCi/L) 15

ERDF Groundwater Well Samples

## METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- YZED	DETECTOR
------------------	------------------	-----------------	---------------	-----	-----------	-------------	---------------	------------	----------	--------------	-------------	--------------	--------------	---------------	----------

Preparation batch 7148-075 2σ prep error 10.0 % Reference Lab Notebook #7148, pg. 075

B1DMV8	R510085-01	5.4	0.100	93	50	40	11/17/05	11/22	GRB-203
Method Blank	R510085-03	5.1	0.100	99	50	11/17/05	11/21	GRB-203	
Lab Control Sample	R510085-02	5.3	0.100	97	50	11/17/05	11/21	GRB-202	
Duplicate (R510085-01)	R510085-04	5.6	0.100	97	50	40	11/17/05	11/22	GRB-201

Nominal values and limits from method 15 0.100 20-105 50 180

PROCEDURES	REFERENCE	TC99_TR_SEP_LSC
CP-431	Technetium-99 Purification of Soil or Resin by	
	Extraction Chromatography, rev 2	
CP-008	Heavy Element Electroplating, rev 9	

AVERAGES ± 2 SD	MDA	5.4	±	0.42
FOR 4 SAMPLES	YIELD	96	±	5

METHOD SUMMARIES

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SUMMARY DATA SECTION

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Lab id	EBERLINE
Protocol	Hanford
Version	Ver 1.0
Form	DVD-CMS
Version	3.06
Report date	11/23/05

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0047

Test RAT Matrix WATER

SDG 7319

Contact Melissa C. Mannion

## METHOD SUMMARY

TOTAL ALPHA RADIUM IN WATER

GAS PROPORTIONAL COUNTING

Client Hanford

Contract No. 630

Contract SDG K0047

## RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Total Radium
------------------	------------------	-----------------	------------------	--------------

Preparation batch 7148-075

B1DMV8	R510085-01	7319-001	U
Method Blank	R510085-03	7319-003	U
Lab Control Sample	R510085-02	7319-002	ok
Duplicate (R510085-01)	R510085-04	7319-004	- U

Nominal values and limits from method RDLs (pCi/L) 1.0

ERDF Groundwater Well Samples

## METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
------------------	------------------	-----------------	---------------	-----	-----------	-------------	---------------	------------	----------	--------------	-------------	--------------	--------------	-------------------	------	----------

Preparation batch 7148-075 2σ prep error 5.0 % Reference Lab Notebook #7148, pg. 075

B1DMV8	R510085-01	0.61	0.200	95	100	36	11/16/05	11/18	GAW-115
Method Blank	R510085-03	0.54	0.200	92	100	11/16/05	11/18	GAW-114	
Lab Control Sample	R510085-02	0.55	0.200	92	100	11/16/05	11/18	GAW-114	
Duplicate (R510085-01)	R510085-04	0.61	0.200	94	100	36	11/16/05	11/18	GAW-115

Nominal values and limits from method 1.0 0.200 20-105 100 180

PROCEDURES	REFERENCE	RATOT_GPC
DWP-880	Total Radium in Drinking Water, rev 0	

AVERAGES ± 2 SD	MDA	0.58 ± 0.075
FOR 4 SAMPLES	YIELD	93 ± 3

## METHOD SUMMARIES

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## SUMMARY DATA SECTION

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Protocol	Hanford
Version	Ver 1.0
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# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0047

Test 82B Matrix WATER

SDG 7319

Contact Melissa C. Mannion

## METHOD SUMMARY

GROSS BETA IN WATER

GAS PROPORTIONAL COUNTING

Client Hanford

Contract No. 630

Contract SDG K0047

## RESULTS

LAB		RAW		SUF-		1: Gross		2: Sum, Beta		RESULT RATIO (%)	
CLIENT SAMPLE ID	SAMPLE ID	TEST	FIX	PLANCHET	Beta	Emitters				2+1	2σ
Preparation batch 7148-075											
B1DMV8	R510085-01	82		7319-001	44.6						
Method Blank	R510085-03	82		7319-003	U						
Lab Control Sample	R510085-02	82		7319-002	ok						
Duplicate (R510085-01)	R510085-04	82		7319-004	ok						
Nominal values and limits from method				RDLs (pCi/L)	4.0						
ERDF Groundwater Well Samples										Average	

## METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST	SUF- FIX	MDA pCi/L	ALIQ L	PREP FAC	DILU- TION	RESID mg	EFF %	COUNT min	FWHM keV	DRIFT keV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
Preparation batch 7148-075 2σ prep error 15.0 % Reference Lab Notebook #7148, pg. 075																
B1DMV8	R510085-01	82		2.0	0.300			81	100				34	11/10/05	11/16	GRB-105
Method Blank	R510085-03	82		1.8	0.300			61	100					11/10/05	11/12	GRB-216
Lab Control Sample	R510085-02	82		1.9	0.300			61	100					11/10/05	11/12	GRB-210
Duplicate (R510085-01)	R510085-04	82		1.9	0.300			79	100				34	11/10/05	11/16	GRB-209
Nominal values and limits from method				4.0	0.300			5-250	100			180				

PROCEDURES REFERENCE 900.0\_ALPHABETA\_GPC  
CP-120 Gross Alpha and Gross Beta in Water, rev 6

AVERAGES ± 2 SD MDA 1.9 ± 0.16  
FOR 4 SAMPLES RESIDUE 70 ± 22

METHOD SUMMARIES

Page 3

SUMMARY DATA SECTION

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Lab id EBRLNE

Protocol Hanford

Version Ver 1.0

Form DVD-CMS

Version 3.06

Report date 11/23/05

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0047

Test 88A Matrix WATER  
SDG 7319  
Contact Melissa C. Mannion

## METHOD SUMMARY

GROSS ALPHA IN WATER  
GAS PROPORTIONAL COUNTING

Client Hanford  
Contract No. 630  
Contract SDG K0047

## RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Gross Alpha
------------------	------------------	-----------------	------------------	-------------

Preparation batch 7148-075

B1DMV8	R510085-01	88	7319-001	U
Method Blank	R510085-03	88	7319-003	U
Lab Control Sample	R510085-02	88	7319-002	ok
Duplicate (R510085-01)	R510085-04	88	7319-004	ok

Nominal values and limits from method RDLs (pCi/L) 3.0  
ERDF Groundwater Well Samples

## METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA L	ALIQ L	PREP FAC	DILU- TION	RESID mg	EFF %	COUNT min	FWHM keV	DRIFT keV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
------------------	------------------	-----------------	---------------	----------	-----------	-------------	---------------	-------------	----------	--------------	-------------	--------------	--------------	-------------------	------	----------

Preparation batch 7148-075 2σ prep error 20.0 % Reference Lab Notebook #7148, pg. 075

B1DMV8	R510085-01	88	1.5	0.300				78	100				36	11/10/05	11/18	GRB-114
Method Blank	R510085-03	88	0.92	0.300				59	100					11/10/05	11/18	GRB-116
Lab Control Sample	R510085-02	88	1.5	0.300				60	100					11/10/05	11/22	GRB-105
Duplicate (R510085-01)	R510085-04	88	0.51	0.300				80	400				36	11/10/05	11/18	GRB-216

Nominal values and limits from method 3.0 0.300 5-250 100 180

PROCEDURES REFERENCE 900.0\_ALPHABETA\_GPC  
CP-120 Gross Alpha and Gross Beta in Water, rev 6

AVERAGES ± 2 SD MDA 1.1 ± 0.97  
FOR 4 SAMPLES RESIDUE 69 ± 23

## METHOD SUMMARIES

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## SUMMARY DATA SECTION

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Lab id EBRLNE  
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# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0047

Test I Matrix WATER  
SDG 7319  
Contact Melissa C. Mannion

## METHOD SUMMARY

IODINE 129 IN WATER

GAMMA SPECTROSCOPY

Client Hanford  
Contract No. 630  
Contract SDG K0047

## RESULTS

LAB RAW SUF-  
CLIENT SAMPLE ID SAMPLE ID TEST FIX PLANCHET Iodine 129

Preparation batch 7148-075

B1DMV8	R510085-01	7319-001	5.30
Method Blank	R510085-03	7319-003	U
Lab Control Sample	R510085-02	7319-002	ok
Duplicate (R510085-01)	R510085-04	7319-004	ok U

Nominal values and limits from method RDLs (pCi/L) 5.0

ERDF Groundwater Well Samples

## METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW SUF- TEST FIX	MDA pCi/L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
------------------	---------------	-------------------	-----------	--------	----------	------------	---------	-------	-----------	----------	-----------	-----------	----------------	------	----------

Preparation batch 7148-075 2σ prep error 5.0 % Reference Lab Notebook #7148, pg. 075

B1DMV8	R510085-01	3.4	0.250	73	1013	36	11/18/05	11/18	XSPEC-004
Method Blank	R510085-03	4.0	0.250	74	536	11/18/05	11/21	XSPEC-004	
Lab Control Sample	R510085-02	12	0.250	61	230	11/18/05	11/19	XSPEC-004	
Duplicate (R510085-01)	R510085-04	4.3	0.250	75	820	39	11/18/05	11/21	XSPEC-004

Nominal values and limits from method 5.0 0.250 20-105 300 100 180

PROCEDURES	REFERENCE	I129_SEP_LEPS_GS
CP-024	Iodine-129, Sample Dissolution, rev 5	
CP-530	Iodine-129 Purification, rev 1	

AVERAGES ± 2 SD	MDA	5.9	±	8.1
FOR 4 SAMPLES	YIELD	71	±	13

## METHOD SUMMARIES

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## SUMMARY DATA SECTION

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# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0047

Test U T Matrix WATER

SDG 7319

Contact Melissa C. Mannion

## METHOD SUMMARY

URANIUM, TOTAL IN WATER

KINETIC PHOSPHORIMETRY (KPA)

Client Hanford

Contract No. 630

Contract SDG K0047

## RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Total Uranium
------------------	------------------	-----------------	------------------	------------------

Preparation batch 7148-075

B1DMV8	R510085-01		7319-001	2.00
Method Blank	R510085-03		7319-003	U
Lab Control Sample	R510085-02		7319-002	ok
Duplicate (R510085-01)	R510085-04		7319-004	ok

Nominal values and limits from method RDLs (ug/L) 0.10  
ERDF Groundwater Well Samples

## METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- TEST FIX	MDA ug/L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT keV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
------------------	------------------	-----------------	------------------	-------------	-----------	-------------	---------------	------------	----------	--------------	-------------	--------------	--------------	-------------------	------	----------

Preparation batch 7148-075 2σ prep error 9.0 % Reference Lab Notebook #7148, pg. 075

B1DMV8	R510085-01			0.055	0.0200								25	11/07/05	11/07	KPA-001
Method Blank	R510085-03			0.054	0.0200									11/07/05	11/07	KPA-001
Lab Control Sample	R510085-02			0.54	0.0200									11/07/05	11/07	KPA-001
Duplicate (R510085-01)	R510085-04			0.055	0.0200								25	11/07/05	11/07	KPA-001

Nominal values and limits from method 0.10 0.0200 180

PROCEDURES	REFERENCE	UTOT_KPA
CP-044	Sample Preparation for Total Uranium by Kinetic Phosphorimetry, rev 6	
CP-929	Calibration of the Kinetic Phosphorimeter, rev 9	

AVERAGES ± 2 SD	MDA <u>0.18</u> ± <u>0.49</u>
FOR 4 SAMPLES	YIELD _____ ± _____

METHOD SUMMARIES

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SUMMARY DATA SECTION

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Lab id	<u>EBRLNE</u>
Protocol	<u>Hanford</u>
Version	<u>Ver 1.0</u>
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Version	<u>3.06</u>
Report date	<u>11/23/05</u>

# EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP K0047

## METHOD SUMMARY

CARBON 14 IN WATER

LIQUID SCINTILLATION COUNTING

Test C Matrix WATER

SDG 7319

Contact Melissa C. Mannion

Client Hanford

Contract No. 630

Contract SDG K0047

## RESULTS

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- PLANCHET	Carbon 14
------------------	------------------	-----------------	------------------	-----------

Preparation batch 7148-075

B1DMV8	R510085-01	7319-001	U	
Method Blank	R510085-03	7319-003	U	
Lab Control Sample	R510085-02	7319-002	ok	
Duplicate (R510085-01)	R510085-04	7319-004	-	U
Spike (R510085-01)	R510085-05	7319-005	LOW	X

Nominal values and limits from method RDLs (pCi/L) 200  
ERDF Groundwater Well Samples

## METHOD PERFORMANCE

CLIENT SAMPLE ID	LAB SAMPLE ID	RAW TEST FIX	SUF- pCi/L	MDA pCi/L	ALIQ L	PREP FAC	DILU- TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	ANAL- PREPARED	YZED	DETECTOR
------------------	------------------	-----------------	---------------	--------------	-----------	-------------	---------------	------------	----------	--------------	-------------	--------------	--------------	-------------------	------	----------

Preparation batch 7148-075 2σ prep error 10.0 % Reference Lab Notebook #7148, pg. 075

B1DMV8	R510085-01	60	0.0300	100	50	32	11/14/05	11/14	LSC-004
Method Blank	R510085-03	62	0.0300	100	50	11/14/05	11/14	LSC-004	
Lab Control Sample	R510085-02	140	0.0300	100	10	11/14/05	11/14	LSC-004	
Duplicate (R510085-01)	R510085-04	58	0.0300	100	50	32	11/14/05	11/14	LSC-004
Spike (R510085-01)	R510085-05	250	0.0200	100	7	32	11/14/05	11/14	LSC-004

Nominal values and limits from method 200 0.0300 50 180

PROCEDURES REFERENCE C14\_CHEM\_LSC  
CP-241 Carbon-14 in Aqueous Samples, rev 6

AVERAGES ± 2 SD MDA 110 ± 170  
FOR 5 SAMPLES YIELD 100 ± 0

METHOD SUMMARIES

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SUMMARY DATA SECTION

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Lab id EBRLNE  
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Version Ver 1.0  
Form DVD-CMS  
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# EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP K0047

SDG 7319  
Contact Melissa C. Mannion

## REPORT GUIDE

Client Hanford  
Contract No. 630  
Case no SDG K0047

## SAMPLE SUMMARY

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

- \* LAB SAMPLE ID is the lab's primary identification for a sample.
- \* DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.
- \* CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.
- \* QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.

QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.

- \* All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

### REPORT GUIDES

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### SUMMARY DATA SECTION

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Lab id EBRLNE  
Protocol Hanford  
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EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP K0047

SDG 7319  
Contact Melissa C. Mannion

REPORT GUIDE

Client Hanford  
Contract No. 630  
Case no SDG K0047

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

- \* The preparation batches are shown in the same order as the Method Summary Reports are printed.
- \* Only analyses of planchets relevant to the SDG are included.
- \* Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.
- \* The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

These qualifiers should be reviewed as follows:

- X Some data has been manually entered or modified.  
Transcription errors are possible.
- P One or more results are 'preliminary'. The data is not ready for final reporting.
- 2 There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

REPORT GUIDES

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SUMMARY DATA SECTION

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Lab id EBRLNE  
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**EBERLINE SERVICES / RICHMOND****SAMPLE DELIVERY GROUP K0047**SDG 7319  
Contact Melissa C. Mannion**REPORT GUIDE**Client Hanford  
Contract No. 630  
Case no SDG K0047**WORK SUMMARY**

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

- \* TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.
- \* SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.
- \* The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.
- \* PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.
- \* For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.
- \* The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

**REPORT GUIDES**

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**SUMMARY DATA SECTION**

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Lab id EBRLNE  
Protocol Hanford  
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# EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP K0047

SDG 7319  
Contact Melissa C. Mannion

## REPORT GUIDE

Client Hanford  
Contract No. 630  
Case no SDG K0047

## DATA SHEET

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

- \* TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.
- \* The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

- \* ERRORS can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.
- \* A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.
- \* When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

U The RESULT is less than the MDA (Minimum Detectable Activity).

### REPORT GUIDES

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### SUMMARY DATA SECTION

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# EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP K0047

SDG 7319  
Contact Melissa C. Mannion

GUIDE, cont.

Client Hanford  
Contract No. 630  
Case no SDG\_K0047

## DATA SHEET

If the MDA is blank, the ERROR is used as the limit.

- J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.
- B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.

Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.

For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.

- L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.
- H Similar to 'L' except the recovery was high.
- P The RESULT is 'preliminary'.
- X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.
- 2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

- \* An MDA is underlined if it is bigger than its RDL.

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### SUMMARY DATA SECTION

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Lab id EBRLNE  
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# EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP K0047

SDG 7319  
Contact Melissa C. Mannion

GUIDE, cont.

Client Hanford  
Contract No. 630  
Case no SDG K0047

## DATA SHEET

- \* An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA may not be a good estimate of the 'real' minimum detectable activity.
- \* A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.
- \* When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

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# EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP K0047

SDG 7319  
Contact Melissa C. Mannion

## REPORT GUIDE

Client Hanford  
Contract No. 630  
Case no SDG\_K0047

### LAB CONTROL SAMPLE

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.
- \* An amount ADDED is the lab's value for the actual amount spiked into this sample with its ERROR an estimate of the error of this amount.

An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- \* REC (Recovery) is RESULT divided by ADDED expressed as a percent.
- \* The first, computed limits for the recovery reflect:
  1. The error of RESULT, including that introduced by rounding the result prior to printing.
 

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.
  2. The error of ADDED.
  3. A lab specified, per analyte bias. The bias changes the center of the computed limits.
- \* The second limits are protocol defined upper and lower QC limits for the recovery.
- \* The recovery is underlined if it is outside either of these ranges.

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SDG 7319  
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## REPORT GUIDE

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### DUPLICATE

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- \* The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTS divided by their average expressed as a percent.

If both RESULTS are less than their MDAs, no RPD is computed and a '-' is printed.

For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

- \* The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTS prior to printing.

If this limit is labeled TOT, it includes the preparation error in the RESULTS. If labeled CNT, it does not.

This value reported for this limit is at most 999.

- \* The second limit for the RPD is the larger of:

1. A fixed percentage specified in the protocol.

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## DUPLICATE

2. A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.

- \* The RPD is underlined if it is greater than either limit.
- \* If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

- \* The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

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## REPORT GUIDE

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## MATRIX SPIKE

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

- \* All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.

If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTS are underlined.

- \* An amount ADDED is the lab's value for the actual amount spiked into the Spike sample with its ERROR an estimate of the error of this amount.

An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

- \* REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.

- \* The first, computed limits for the recovery reflect:

1. The errors of the two RESULTS, including those introduced by rounding them prior to printing.

If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

2. The error of ADDED.

3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

- \* The second limits are protocol defined upper and lower QC limits

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SDG 7319  
Contact Melissa C. Mannion

GUIDE, cont.

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## MATRIX SPIKE

for the recovery.

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

- \* The recovery is underlined (out of spec) if it is outside either of these ranges.

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# EBERLINE SERVICES / RICHMOND

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SDG 7319

Contact Melissa C. Mannion

## REPORT GUIDE

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## METHOD SUMMARY

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

- \* Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

- \* The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

- \* If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

The J and X flags are as on the data sheet.

- \* Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.
- \* Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data'

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SDG 7319  
Contact Melissa C. Mannion

GUIDE, cont.

Client Hanford  
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## METHOD SUMMARY

means no amount ADDED was specified. 'LOW' and 'HIGH' correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

- \* Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.
  - \* If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.
- MDAs are underlined if greater than the printed RDL.
- \* Aliquots are underlined if less than the nominal value specified for the method.
  - \* Preparation factors are underlined if greater than the nominal value specified for the method.
  - \* Dilution factors are underlined if greater than the nominal value specified for the method.
  - \* Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.
  - \* Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.
  - \* Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

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SDG 7319  
Contact Melissa C. Mannion

GUIDE, cont.

Client Hanford  
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## METHOD SUMMARY

- \* Count times are underlined if less than the nominal value specified for the method.
- \* Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.
- \* Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.
- \* Days Held are underlined if greater than the holding time specified in the protocol.
- \* Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1÷3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant

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SDG 7319  
Contact Melissa C. Mannion

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METHOD SUMMARY

results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. Results less than their MDA are not included. No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the measurements.

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SUMMARY DATA SECTION

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<b>PNNL</b>		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>		C.O.C. # <b>B03-018-124</b>	
				Page <u>1</u> of <u>1</u>	
Collector <b>D. R. BREWINGTON</b>		Contact/Requester <b>KCC47 (7319)</b>		Telephone No.      MSIN      FAX	
SAF No. <b>B03-018</b>		Sampling Origin		Purchase Order/Charge Code	
Project Title <b>ERDE Groundwater Well Samples</b>		<b>DTS SALS H93</b>		Ice Chest No. <b>S4L584</b> Temp.	
Shipped To (Lab) <b>Eberline Services</b>		Method of Shipment		Bill of Lading/Air Bill No. <b>791237170500</b>	
Protocol <b>GPP</b>		Priority: 45 Days		Offsite Property No.	
POSSIBLE SAMPLE HAZARDS/REMARKS .. ..			SPECIAL INSTRUCTIONS      Hold Time      Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		

Sample No.	Lab ID	*	Date	Time	No/Type Container	Sample Analysis	Preservative
B1DMV8		W	10-13-05	0954	1x20-mL P	Activity Scan	None
B1DMV8		W			2x1000-mL G/P	Gross Alpha, Gross Beta	HNO3 to pH <2
B1DMV8		W			1x125-mL G/P	Carbon-14	None
B1DMV8		W			4x1000-mL G/P	Iodine-129	None
B1DMV8		W			1x1000-mL G/P	Total Radium	HNO3 to pH <2
B1DMV8		W			1x250-mL G/P	Technetium-99	HCl to pH <2
B1DMV8		W			1x100-mL G/P	Total Uranium	HNO3 to pH <2

Relinquished By <b>D. R. BREWINGTON</b>		Print      Sign		Date/Time <b>10/13/2005</b>		Received By <b>FED EX</b>		Print      Sign		Date/Time		<b>Matrix *</b> S = Soil      DS = Drum Solid SE = Sediment      DL = Drum Liquid SO = Solid      T = Tissue SL = Sludge      WI = Wine W = Water      LI = Liquid O = Oil      V = Vegetation A = Air      X = Other	
Relinquished By <b>FED EX</b>				Date/Time <b>10/14/05</b>		Received By <b>FEM</b>				Date/Time <b>10:00</b>			
Relinquished By				Date/Time		Received By				Date/Time			
Relinquished By				Date/Time		Received By				Date/Time			
<b>FINAL SAMPLE DISPOSITION</b>		Disposal Method (e.g., Return to customer, per lab procedure, used in process)						Disposed By		Date/Time			



# RICHMOND, CA LABORATORY

## SAMPLE RECEIPT CHECKLIST

Client: DNNL City: MCHLAND State: WA  
Date/Time received: 10/14/05 10:00 CoC No. B03-018-124  
Container I.D. No. SML 584 Requested TAT (Days) 45 P.O. Received Yes [ ] No [ ]

### INSPECTION

1. Custody seals on shipping container intact? Yes ☒ No [ ] N/A [ ]
2. Custody seals on shipping container dated & signed? Yes ☒ No [ ] N/A [ ]
3. Custody seals on sample containers intact? Yes ☒ No [ ] N/A [ ]
4. Custody seals on sample containers dated & signed? Yes ☒ No [ ] N/A [ ]
5. Packing material is: Wet [ ] Dry ☒
6. Number of samples in shipping container: 1 Sample Matrix W
7. Number of containers per sample: 11 (Or see CoC \_\_\_\_\_)
8. Samples are in correct container Yes ☒ No [ ]
9. Paperwork agrees with samples? Yes ☒ No [ ]
10. Samples have: Tape [ ] Hazard labels [ ] Rad labels [ ] Appropriate sample labels ☒
11. Samples are: In good condition ☒ Leaking [ ] Broken Container [ ] Missing [ ]
12. Samples are: Preserved ☒ Not preserved ☒ pH 1/7 Preservative HNO<sub>3</sub>, HCL
13. Describe any anomalies:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

14. Was P.M. notified of any anomalies? Yes [ ] No [ ] Date \_\_\_\_\_  
15. Inspected by MFU Date: 10/14/05 Time: 11:30

Customer Sample No.	cpm	mR/hr	Wipe	Customer Sample No.	cpm	mR/hr	wipe

Ion Chamber Ser. No. \_\_\_\_\_

Calibration date \_\_\_\_\_

Alpha Meter Ser. No. \_\_\_\_\_

Calibration date \_\_\_\_\_

Beta/Gamma Meter Ser. No. \_\_\_\_\_

Calibration date \_\_\_\_\_